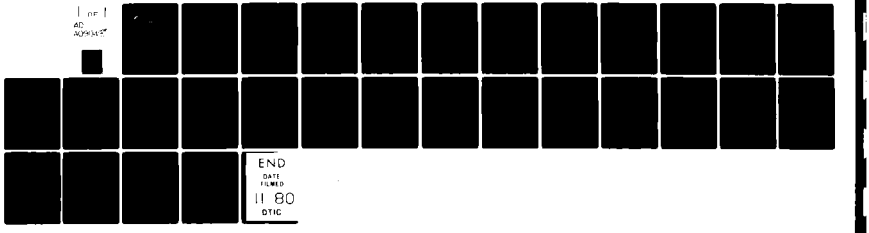
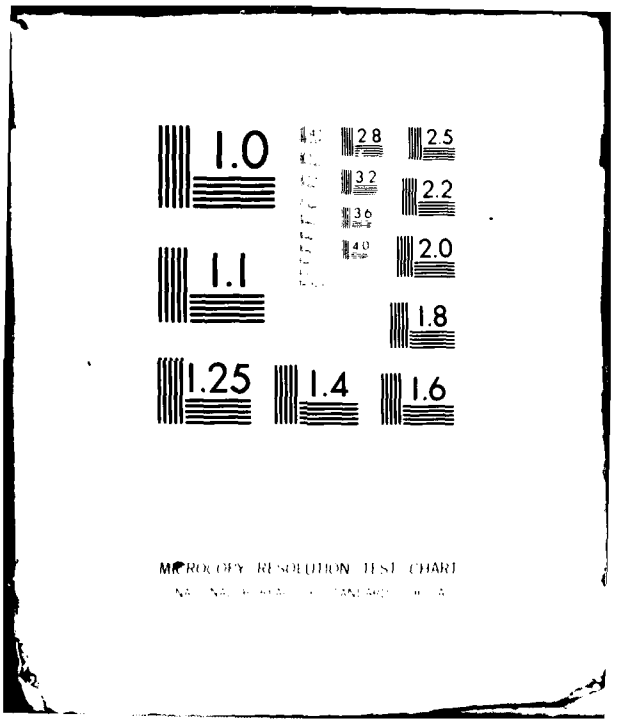
AD-A090 492 ELECTRONICS ENGINEERING GROUP (1842ND) SCOTT AFB IL F/G 17/2
ANALYSIS & EXPANSION OF INTERFACE CONTROL FACILITY (TACTICAL SY--ETC(U)
SEP 80 A W REISS
UNCLASSIFIED 1842 EEG/EETS-TR-80-14 NL




1.0
1.1
1.25
1.4
1.6
2.8
3.2
3.6
4.0
2.5
2.2
2.0
1.8
MICROCOPY RESOLUTION TEST CHART

LEVEL II

1842 EEG/EETS TR 80-14

AD A090492

DDC FILE COPY

AFCC TECHNICAL REPORT

ANALYSIS & EXPANSION

OF

INTERFACE CONTROL FACILITY

(TACTICAL SYSTEMS INTEROPERABILITY

& SUPPORT CENTER)

LANGLEY AFB, VIRGINIA

DATA COMMUNICATIONS SYSTEMS BRANCH
1842 ELECTRONICS ENGINEERING GROUP (AFCC)
SCOTT AFB, ILLINOIS

30 SEPTEMBER 1980

1842 ELECTRONICS ENGINEERING GROUP

MISSION

The 1842 Electronics Engineering Group (EEG) has the mission to provide communications-electronics-meteorological (CEM) systems engineering and consultive engineering support for AFCC. In this respect, 1842 EEG responsibilities include: Developing engineering and installation standards for use in planning, programming, procuring, engineering, installing and testing CEM systems, facilities and equipment; performing systems engineering of CEM requirements that must operate as a system or in a system environment; operating a specialized Digital Network System Facility to analyze and evaluate new digital technology for application to the Defense Communications System (DCS) and other special purpose systems; operating a facility to prototype systems and equipment configurations to check out and validate engineering-installation standards and new installation techniques; providing consultive CEM engineering assistance to HQ AFCC, AFCC Areas, MAJCOMS, DOD and other government agencies.

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

(14) 1842 EEG/EETS-11-D-14

REPORT DOCUMENTATION PAGE

READ INSTRUCTIONS BEFORE COMPLETING FORM

1. REPORT NUMBER: TR-80-14	2. GOVT ACCESSION NO.: AD A090492
3. RECIPIENT'S CATALOG NUMBER: N/A	
4. TITLE (and Subtitle): Analysis & Expansion of Interface Control Facility (Tactical Systems Interoperability & Support Center) Langley AFB, VA	5. TYPE OF REPORT & PERIOD COVERED: N/A
	6. PERFORMING ORG. REPORT NUMBER: N/A
7. AUTHOR(s): (10) Anthony W. Reiss	8. CONTRACT OR GRANT NUMBER(s): N/A
9. PERFORMING ORGANIZATION NAME AND ADDRESS: 1842 EEG/EETSC, Scott AFB, IL 62225	10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS: (11) 30 Sep 1
11. CONTROLLING OFFICE NAME AND ADDRESS: 1842 EEG/EETSC, Scott AFB, IL 62225	12. REPORT DATE
	13. NUMBER OF PAGES
14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office)	15. SECURITY CLASS. (of this report): Unclassified
(12) 29	15a. DECLASSIFICATION/DOWNGRADING SCHEDULE

16. DISTRIBUTION STATEMENT (of this Report)

Approved for public release. Distribution unlimited.

17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)

N/A

18. SUPPLEMENTARY NOTES

N/A

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

Patch and Test Facility.

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

The Tactical Interface Control Facility (ICF) provides the interface between the transmission system (leased lines) and the HQ TAC/AD Tactical Systems Interoperability and Support Center (TSISC). New computer systems will strain the capability of the ICF. This report provides recommendations for near and long term implementation to provide the ICF with increased capability and flexibility.

DD FORM 1 JAN 73 1473 EDITION OF 1 NOV 65 IS OBSOLETE

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

401646

APPROVAL PAGE

This report has been reviewed and is approved for publication and distribution.

Z. J. Bara

ZYGMUND J. BARA
1842 EEG/EET (AFCC)
Chief, Telecom Systems Engrg Div

Anthony W. Reiss

ANTHONY W. REISS
1842 EEG/EETSC (AFCC)
Electronics Engineer, Author

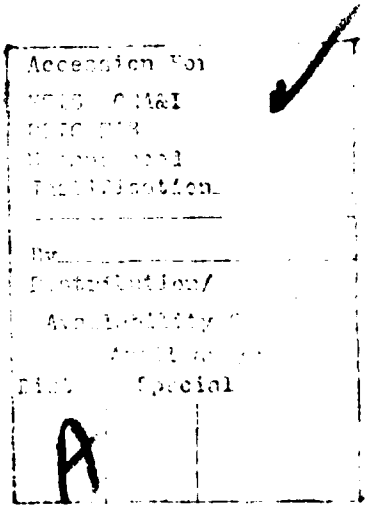


TABLE OF CONTENTS

TABLE OF CONTENTS (Continued)

TABLE OF CONTENTS (Continued)

FIGURES

TABLES

1. INTRODUCTION

1.1 Scope: This study is limited to an examination of the Interface Control Facility (ICF) which is installed in the Tactical Systems Interoperability and Support Center (TSISC) at Building 25, Langley AFB VA.

1.2 Purpose: The purpose of the study is to provide recommendations to satisfy the near term and future growth requirements of the ICF.

1.3 Background: The ICF was installed in Building 25 in 1978 by elements of Southern Communications Area. The ICF is a prototype patch and test facility that provides the electrical interface between the transmission system (leased landlines) and the various tactical computer systems installed in the TSISC. At the time of installation, the ICF had a 50-100 percent expansion capability. However, subsequent installation of Tactical Software Support Facilities, as well as offline support computers, has decreased the ICF's expansion capabilities to a minimum. Future computer installations are expected to exceed the ICF's capabilities.

2. DISCUSSION

2.1 Facility Description:

2.1.1 General Detail. The ICF is comprised of 24 equipment bays which are located in two principal areas: a "red" equipment area, and a "black" equipment area. The two areas are parallel rows with equipment front panels facing a common work area located between the rows. Most equipment bays are CY-597 A/G cabinets; although, some equipment bays are of commercial design. The ICF performs the typical functions of a technical control facility when supporting a computer system during operation. However, there are some unique features of the ICF which must be described to place the facility's operation/configuration in proper perspective. First, as already noted, the equipment is located in a "red" area and in a "black" area. This varies from most patch and test or technical control facilities since they are usually completely located in a "black" area. Secondly, the ICF does not have circuits that are permanently configured or hard wired for day-to-day operation. Thirdly, circuits and equipments are terminated on patch panels. Finally, circuits and equipments are interconnected by insertion of patch cords on the front of the patch panels. This again represents a significant difference from most patch and test or technical control facilities. An equipment inventory is included as Table 1 (cryptographic and modem equipment were physically counted; and all other equipments and quantities were extracted from a draft document describing the ICF).

Table 1. ICF Equipment Inventory

Item	Quantity	Note
Dictaphone 4000	1	
KG-34	2	1
KWX-11	11	2
KW-7	11	2
Power Supply (for KWX-11)	3	
KG-30	21	
HP 3968A (instrumentation recorder)	1	
HP 3582A (spectrum analyzer)	1	
HP 9872A (plotter)	1	
HP 2631A (printer)	1	
TADIL B Modem	12	
KG-13A	2	1
26C Modem	5	3
TH 85 Modem	3	
TH 22 Modem	1	
MD-674 Modem	2	
HP 3495A (scanner)	4	
Datascopes (7 small oscilloscopes)	1	
Patch Panel (310 jacks)	9	
HP 1340A (display monitor)	1	
HP 4943A (TIMS)	1	
HP 9825A (calculator)	1	
HP 1350A (graphic translator)	1	
Monitor Panel (Cooke)	3	
Patch Panel (Cooke)	9	
Patch Panel (Bantam)	2	
GGM-21	2	
7 Way - 4 Wire Bridge	2	
KY-65	7	4
HP 3581C (freq. selective voltmeter)	1	
Amp & Pads Shelf	1	
Amps Shelf	1	
T-96 Multiplexer	1	

Table 1. ICF Equipment Inventory (Continued)

Item	Quantity	Note
Dataphone 2400 Modem	1	
Nu Data Modem	1	
Level Converter Shelf	1	
IU 188 Converter	1	
Tape Monitor (T-511)	1	
Data scope 502	1	
Tecktronics 454	1	
KG-40	2	
Fuse Panel	4	
Power Control Panel	1	

NOTES:

1. Two not wired.
2. Five not wired.
3. One not wired.
4. Two pre-production.

2.1.2 Specific Detail.

2.1.2.1 Transmission Lines. The ICF has a variety of circuits which appear on patch panels in the VF patch bay: Twenty 4-wire circuits are extended to off-base locations; seven 4-wire circuits and one 2-wire circuit are routed from building 25 to building 23 (across the street); and two 25-pair cables are terminated on tactical cable hocks outside of building 25. All circuits (external to building 25) are terminated at the main distribution frame before making an appearance at the patch modules except two 25-pair cables which are terminated on vertical blocks at the bottom of the VF patch bay. A detailed listing of circuitry is included in Table 2.

Table 2. Circuit Listing

Circuit Designation	Distant Location	4W	2W
GD 37461	San Diego	X	
GD 2800.001	San Diego	X	
GD 2800.002	San Diego	X	
GD 2800.003	San Diego	X	
GD 2800.004	San Diego	X	
GD 30558	Eglin AFB	X	
GD 30559	Eglin AFB	X	
GD 30555	MITRE	X	
GD 30556	MITRE	X	
GD 6150	Tinker AFB	X	
GD 6151	Tinker AFB	X	
GDA 6152	Tinker AFB	X	
GD 1634	Ft. Monmouth	X	
GDA 4840	Ft. Monmouth	X	
GD 4841	Ft. Monmouth	X	
GD 4842	Ft. Monmouth	X	
GD 16730	Ft. Monmouth	X	
GD 6341	Kelly AFB	X	
GD 6342	Kelly AFB	X	
GD 6343	Kelly AFB	X	
No Designation	Bldg 23 - ARTN	X	
No Designation	Bldg 23 - JTCN	X	
No Designation	Bldg 23 - JRTN	X	
No Designation	Bldg 23 - JTON	X	
No Designation	Bldg 23 - JTDN	X	
No Designation	Bldg 23 - ATON	X	
No Designation	Bldg 23 - AEN	X	
No Designation	Bldg 23 - Field Phone		X

NOTE: Patch panels also terminate two 25-pair cables from tactical cable hocks which are located outside of building 25. A third 25-pair cable was extended to a tactical cable hock; however, it was disconnected (unwired) from its patch panel.

2.1.2.2 Cryptographic Equipment. Cryptographic equipment constitutes a major portion of the ICF. The quantity and types of equipment are as shown in Table 1. Of particular interest, historical scheme data provided by Southern Communications Area personnel indicates that for the KG-30's there are two wiring variations between the red demark box and the black demark box. Ten of the KG-30's are wired with a filter between pins 8 and 9 of the red demark box and pins 9 and 10 of the black demark box. The remaining 11 KG-30's are wired without the filter. The filter provides a return path (around the KG-30) for the "modem test" function of the TADIL B modem. Thus, KG-30's having the external filter can be substituted for KG-30's not having the filter, but not vice versa. Demark box wiring is shown in Figures 1 through 4.

2.1.2.3 Equipment Wiring. The ICF does not have an intermediate distribution frame. Equipments are wired directly to patch modules. The 310 type patch modules have the normal through feature removed. All other patch modules (Cooke and Bantam) retain the normal through capability. The 310 type patch modules are primarily located in the VF patch bay (six modules) and in an adjacent bay (three modules). In the VF patch bay, the modules terminate transmission lines, modems, amplifiers, and amplifier and pad combinations. In the adjacent bay, the 310 type patch modules are connected to the ICF's scanners. When required to support a computer test to an out of building location, patch cords are inserted in the front of the 310 type patch modules connecting the equipment jacks to the appropriate line jacks. If signal level adjustment is necessary, additional patch cords are used to include the amplifiers or amplifier and pad combinations in the circuit.

2.1.2.4 Facility Records. A contractor is currently preparing a facility manual for the TSISC and a portion of the document will address the ICF. This information will prove useful in updating plant-in-place records which are out dated. Of the two drawings reviewed (MUHJB00025FP000 and MUHJB00025WD000), neither reflected six new bays that have been installed since Southern Communications Area completed the ICF. Intra facility cable records, per se, do not exist; however, a record is maintained that reflects the termination of each jack on the patch modules.

2.2 New TSISC Requirements: There are 35 new projects identified for the TSISC between now and August 1982 and implementation will impact the ICF. A list of the projects is included as Table 3. Eight of the projects will be installed by Southern Communications Area, four will be addressed by new Statements of Requirement (SOR) and the remaining 21 will primarily be installed by contractors. Note that some of the 21 projects slated for contractor installation may be addressed by SOR's if for some reason the work is not, in fact, accomplished by the contractors. According to data supplied by TAC/ADYCE, simultaneous operation of computer systems in August 1982 will require the following equipment quantities:

ITEM	QUANTITY
KG-30	50
TADIL B Modem	28
KW-7/KWX-11	31
TTY Modems	30
Other Modems	17

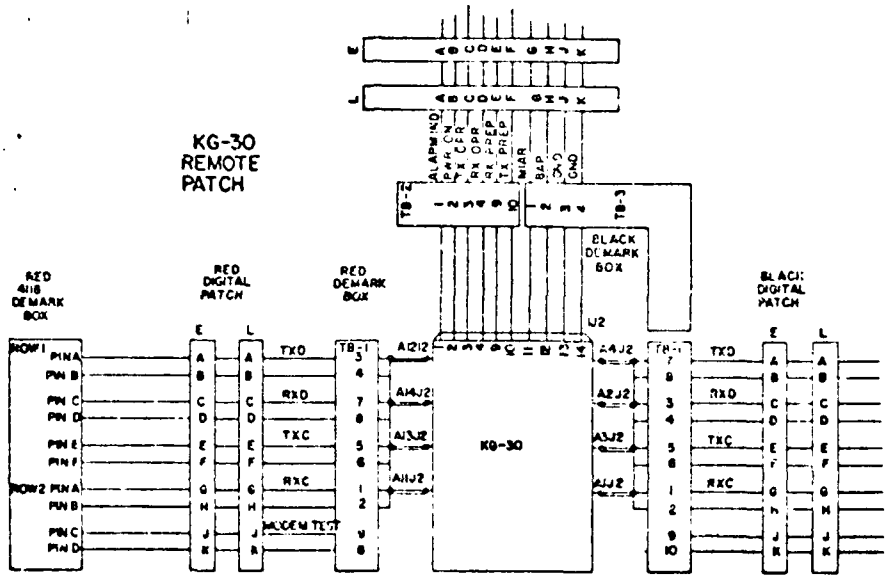


Figure 1. Wiring for KG-30-485L

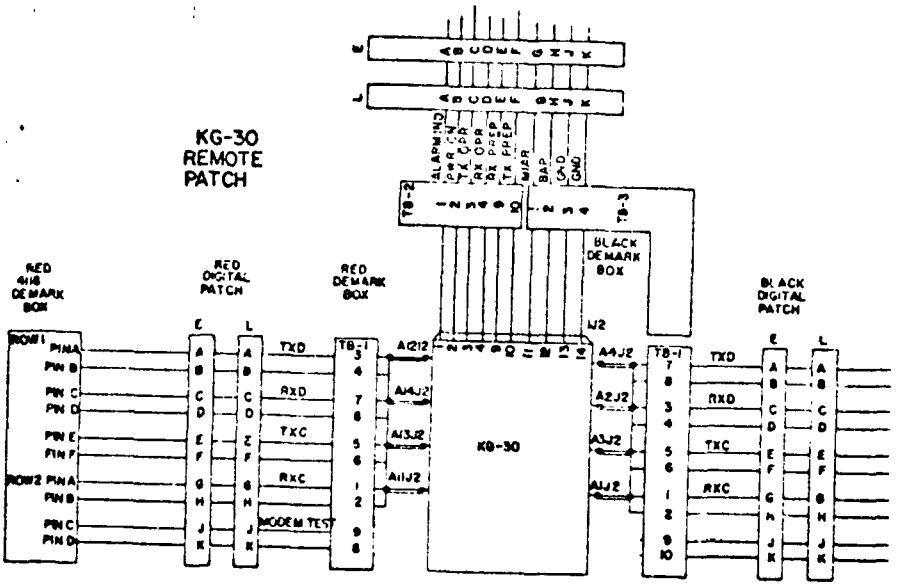


Figure 2. Wiring for KG-30-428L

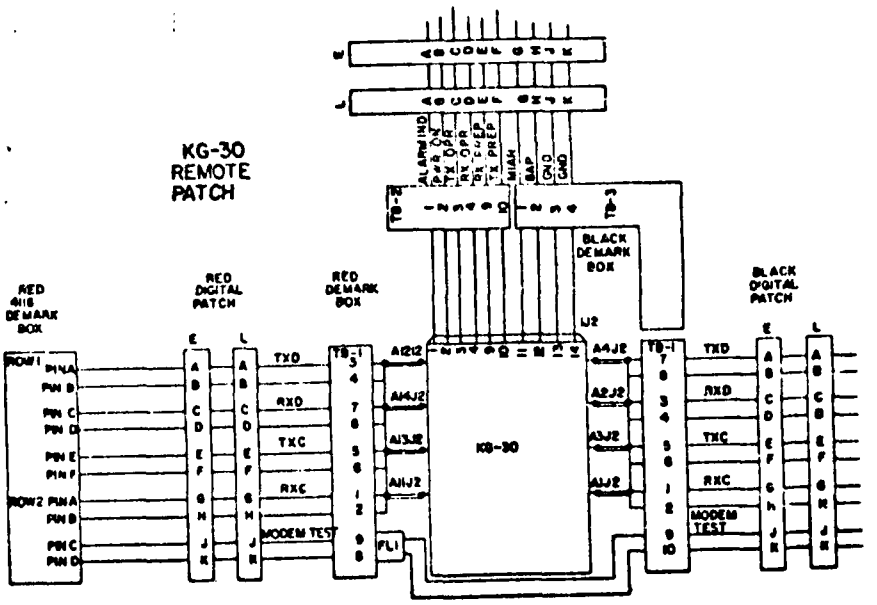


Figure 3. Wiring for KG-30-407L (System 1)

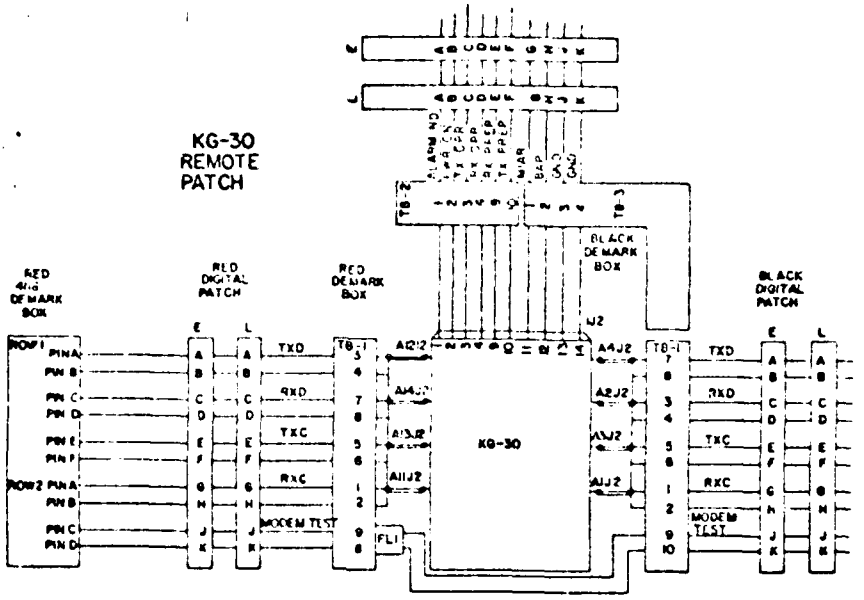


Figure 4. Wiring for KG-30-407L (System 2)

Table 3. TSISC Project Titles

Title
JINTACCS Phase I (asynchronous circuits)
JINTACCS JITS (RED TADIL-B Monitor)
JINTACCS JITS (BLACK TADIL-B Monitor)
JINTACCS JITS (RED TADIL-A Monitor)
JINTACCS JITS (RUI-ESU Link)
JINTACCS JITS (RUI-JITPC Data Link)
JINTACCS Air Operations (Local TTY)
JINTACCS Air Ops (Leased Lines)
JTIDS (TADIL-B)
JTIDS (TTY)
JTIDS (Leased Line)
TIPI DC/SR Communications Upgrade (DDL-Links)
TIPI DC/SR Communications Upgrade (AUTODIN Link)
TIPI DC/SR Communications Upgrade (TTY-Circuits)
TIPI/II (TTY)
TIPI/II (DDL)
TIPI/II (SSF Lines)
CAFMS (TTY Links)
CAFMS (Remote Terminals)
CAFMS (TADIL-B)
CAFMS (AUTODIN)
CAFMS (Leased Lines)
CAFMS PWB/ADYU Support Computer
SMARTS (TADIL-A)
SMARTS (TADIL-B)
SMARTS (TTY)
SMARTS (AUTODIN)
SMARTS (Unique Data Link)
SMARTS (DDL)
RED Intercom Voice Upgrade
TACS Radar Remote
Documentation Center
TACS TADIL-A Upgrade
STEM
Programmer's Work Bench

2.3 ICF Expansion Capability:

2.3.1 Floor Space. As the TSISC is presently configured, the ICF "black" equipment area has more space available for expansion than the "red" equipment area. Five more equipment bays can be located in the "red" equipment row while providing a 3 foot clearance between the end cabinet and the wall. Space for one of the five equipment bays has already been reserved for Scheme 1820A0D0, JINTACCS Phase I (asynchronous circuits). Any further expansion in the red equipment area would require the bays to be placed perpendicular to the existing red equipment row and parallel to the North wall.

2.3.2 Spare Patch Jacks. Approximately 16 percent of the patch jacks are unassigned for those patch modules located in the "red" equipment area and approximately 35 percent in the "black" equipment area. These figures were determined using the draft data which describes the ICF and assuming a normal through jack logic for all except the 310 type patch modules. In the technical control facility upgrades being accomplished under the Manual Technical Control Improvement Program, approximately 50 - 60 percent of the jacks are spares to facilitate future expansion.

2.4 Equipment Utilization Data. Test schedules were examined for a period of five months (March - July 1980) to determine the utilization rate for four major items of ICF equipments: KG-30, TADIL B Modem, KY-65, and KW-7/KWX-11. Data was not available to determine the utilization rate for other equipments in the ICF. Utilization data is presented graphically in Figures 5 and 6.

Table 4. ICF Equipment Utilization Data

Equipment	Number Installed	Average Number Used At Any One Time
KG-30	21	3.40
TADIL B Modem	12	3.76
KY-65	7	1
KW-7/KWX-11	6	0

3. RECOMMENDATIONS

3.1 Near Term:

3.1.1 Plant-in-Place Records. Plant-in-place records should be updated per AFM 100-19, USAF Ground Communications - Electronics Program Implementation Management. All existing drawings depicting equipment wiring, equipment layout per bay, and bay floor location should be verified for accuracy. Additionally, existing drawings should be updated to reflect equipment installed since the ICF installation was completed in 1978.

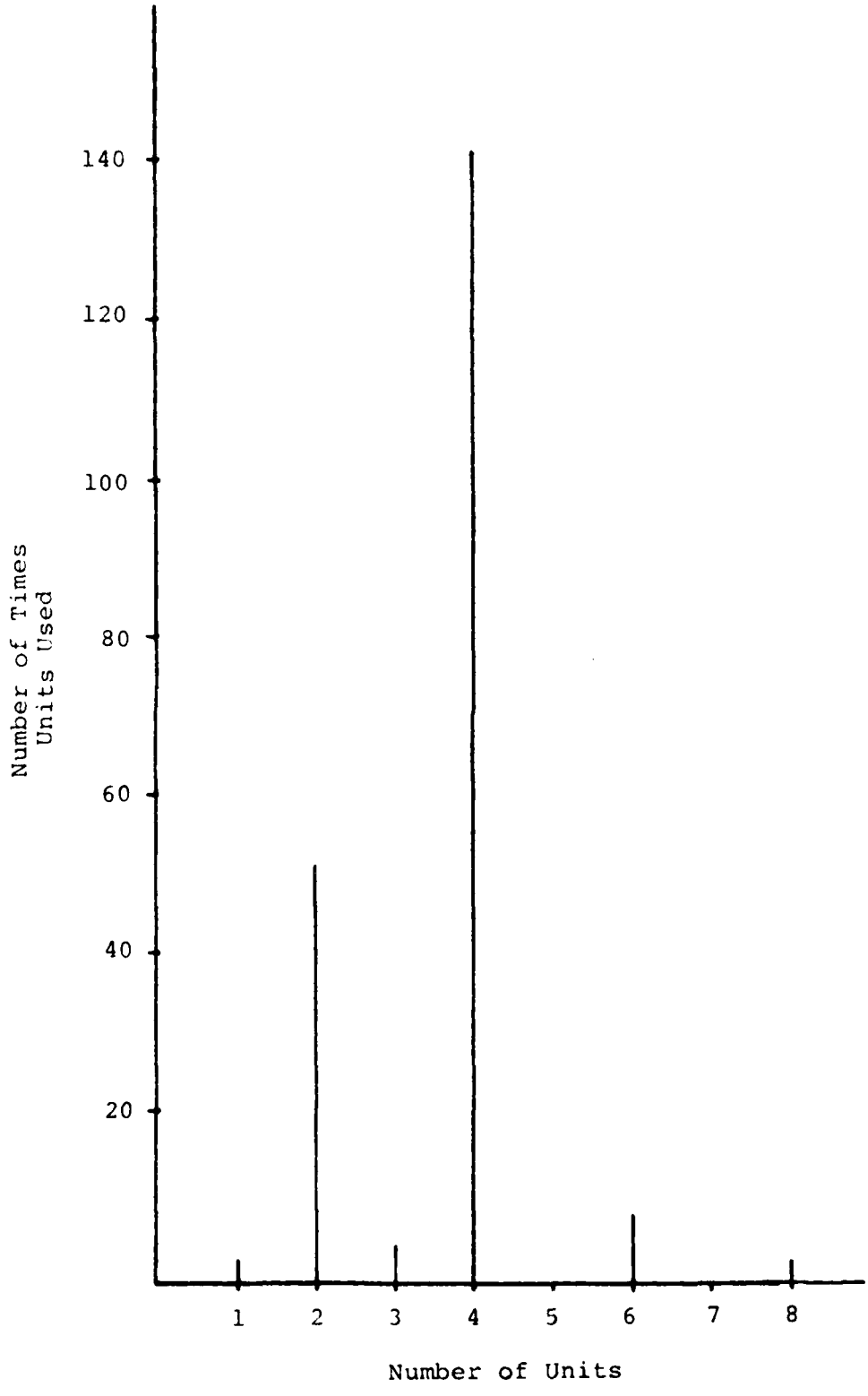


Figure 5. KG-30 Histogram

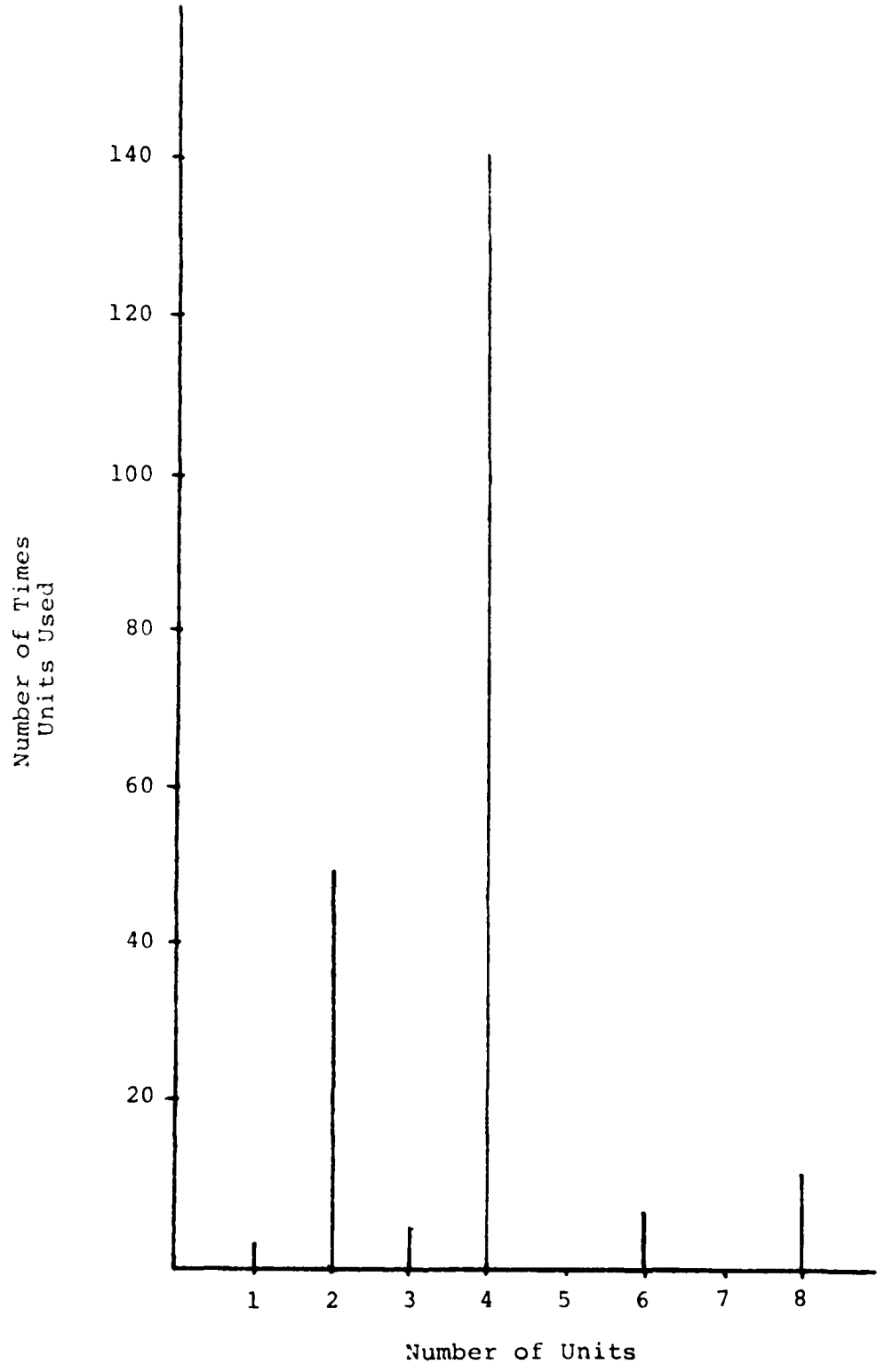


Figure 6. TADIL B Modem Histogram

3.1.2 Intra-Facility Cable Records. Records should be prepared to document intra-facility cables. Specific information to be documented should include, but need not be limited to, the following: cable number, type of cable, end locations, pair assignments, and pair functions. AFTO Form 224, Cable Record (Left Tab 1-20) and 224A, Cable Record (Right Tab 21-51 and 51-70) may be used for this purpose. Cable record sheets can be maintained in a Cable Record Book (NSN 7460-00-970-7230). Further, changes should be documented in the cable records as they occur rather than a periodic update.

3.1.3 Standard Installation Practices Tech Orders (SIPTO). All future installations and/or relocations of equipment in the ICF should be accomplished using techniques described in Air Force SIPTO's. For contract installations and/or relocations, the requirement should be made as a mandatory portion for compliance in the applicable Statement of Work. NOTE: A copy of Headquarters AFCC (OPR) Technical Order Index and Review Schedule was previously provided to TAC/ADYCE personnel for purposes of identifying the appropriate SIPTO's. Available SIPTO's should include, but need not be limited to, those identified in Table 5.

Table 5. List of Recommended SIPTO's

T.O. NUMBER	TITLE
31-10-2	Fanning and Forming Conductors for Ground C-E Equipment
31-10-6	Cable Racks, Troughs, and their Supports
31-10-7	Terminating and Soldering Electrical Connections
31-10-9	Marking Site Layout
31-10-10	Anchoring Devices for ground C-E Equipment
31-10-11	Cross-Connections
31-10-12	Metal Ducts and Conduits
31-10-13	Cabling for Fixed Ground C-E Equipment
31-10-14	RF Connectors and Cables
31-10-16	Strapping of Fixed Ground C-E Components
31-10-29	Erection and Assembly of C-E-M Equipment

3.2 Long Term:

3.2.1 Cryptographic Equipment. The 11 KG-30's that are not wired with a filter between pins 8 and 9 of the red demark box and pins 9 and 10 of the black demark box should be modified so that all ICF KG-30's are wired with the filter. This modification will permit any one KG-30's to be substituted for any other KG-30 should the need arise.

3.2.2 Intermediate Distribution Frames. The ICF should be recabled and two IDF's installed to provide greater flexibility: one IDF should be located in the "black" area; and the other IDF should be located in the "red" area. Rather than use the conventional wire-wrap or solder type terminal block, recommend that the IDF's consist of Circuit Concentration Bay (CCB) modules installed in a CY-597 A/G cabinet with doors on the front and rear since continuous access to the IDF is not normally required. The flexibility (programming ability) of the CCB module used as an IDF coupled with the low rate of ICF equipment utilization should preclude installation of major quantities of new equipments. As an example, patch modules can be configured to support a computer system test and upon completion, the same jacksets reused to support a different computer system test.

3.3 TAC/ADYCE Requirements. A list of requirements was previously provided by TAC/ADYCE for consideration in this report. Each will be addressed with either recommendation for installation in the ICF or rationale for not doing so.

3.3.1. Recommended for adoption.

3.3.1.1 Number and configuration of MDFs and CCBs. IDFs are recommended rather than MDFs. See paragraph 3.2.2. Two CCB configurations are recommended. One configuration is described in Purchase Description AFCC-C-2952 (Attachment 1). The requirements for the other CCB configuration will be identified in a purchase description which will be forwarded by separate correspondence. Essentially the new purchase description will be for a 19 inch panel that contains six horizontal rows and 26 vertical columns in each of two separate groups for a total of 312 connectors per panel. The CCB module described in Attachment 1 will be used to terminate transmission lines, 310 and bantam patch modules, and any other two or three port devices. The new CCB module will be used to terminate Cooke patch modules, cryptographic equipment, and the computer systems. The quantity of CCB modules should be determined during scheme engineering.

3.3.1.2 Station Clock. A station timing source is recommended for the ICF since it will preclude use of cryptographic equipment and modems when computer systems are operated in-house. Such a requirement can be satisfied by the AN/FSQ-44A if the equipment is available; however, the SFEL status is for Record Purposes Only. A second candidate is the CV-3543/G, frequency divider and AM-7003(V)/G, distribution system (requires an external 1 MHz source) which is currently under development by National Security Agency.

3.3.1.3 Current Measuring Device. Recommend installation of a digital multimeter in the near term as a means of measuring current as well as voltages and resistances. A device which will satisfy this requirement is listed in TA-417 for technical control facilities, John Fluke Model 8100A (NSN 6625-00-433-4234).

3.3.1.4 Use CCBs and MDFs. See paragraph 3.3.1.

3.3.1.5 Line Drivers/Receivers. Line drivers/receivers should not be required for the MIL-STD-188C signals between the computer room and the ICF. However, line drivers/receivers are recommended when the EIA RS-232 communications equipment and the computer are separated by more than 50 feet. This requirement can be satisfied in the near term.

3.3.1.6 Black Bridges. Recommend installation of 6-way/4-wire bridges in the near term. Bridges installed on the "black" side of the ICF will increase facility flexibility during periods of computer testing. Three 6-way/4 wire bridges such as the Data Products Model BR-6W4WB, P/N 92350000-000 (NSN 6625-00-602-5144) and one Data Products Universal

Shelf, P/N 90409000-000 will satisfy this requirement. The referenced bridges contain active components and require -48VDC. A less expensive alternative (about one-third the cost) is described in AFCC Standard Drawing LDBWS01021AD000, Conference Bridge-Dual 2 Wire/6 Way, with Test Jacks and Line Amplifier, Installation. This alternative requires either -24 or -48 VDC.

3.3.1.7 Plug-in Modules. Recommend installation of hybrids in the near term. This requirement can be satisfied using up to 12 Data Products hybrids, Model 4TS-2, P/N 80409120-000 (NSN 6625-00-602-5125) and one Universal Shelf, P/N 90409000-000. As in the case of the 6-way/4-wire bridges, the requirement may be satisfied with other equipment, if available. No power required for equipment operation.

3.3.1.8 Matching Transformer. Recommend installation of bridging transformers in the near term. This requirement can be satisfied with bridging transformer (NSN 5950-00-678-0343). No power required for equipment operation.

3.3.2 Not recommended for adoption.

3.3.2.1 Ballast Lamps. Ballast lamps are not recommended for installation in the ICF since the facility does not have the level of rewiring activity that is usually associated with blown power supply fuses.

3.3.2.2 Opto-isolate Red/Black Interbay. An opto-isolated red/black interbay trunk system is not recommended because of the possibility of security compromises through inadvertent patching by an operator.

3.3.2.3 Different Patch Modules to Segregate Interfaces. Different patch modules are not recommended as the means to segregate different types of interfaces. Normally all types of interfaces appear on a patch and test or technical control facility's primary patch panels, and they are usually all the same type patch module. Segregation can be achieved using a color coding in the label strips until the IDF's are installed. Once the IDF's are installed, the different interfaces can be segregated by programming provided by the CCB.

3.3.2.4 Both 60 and 400 Hz Cabinet Access. Do not recommend running both 60 and 400 Hz power to a cabinet unless there is a requirement for both types of power. Ordinarily, this should be accomplished during scheme installation either by the Government or the contractor.

3.3.2.5 Future Power Requirements. Do not recommend pulling wires in place to satisfy future power requirements until those requirements are known and the programs approved and funded. Power can be installed during normal scheme installation.

3.3.2.6 Station Batteries. Recommend continued use of existing power supplies rather than a new station battery system. Implementation of a new station battery system would gain little over the present capability.

3.3.2.7 Signal Line Filters. Signal line filters are not recommended for installation unless a demonstrated need is established during the TEMPEST Test.

3.3.2.8 Field Switchboard. Do not recommend installation of a field switchboard. Patch panels and conditioning equipment should provide the needed flexibility for interconnection of tactical field telephones. If an intercom/orderwire system is needed to connect the various subscribers, then consideration should be given for attaining such a system.

3.3.2.9 Speaker Amplifier. This requirement will be addressed in separate correspondence (subject classified).

3.3.2.10 Paging System. Do not recommend that a paging system be installed. This requirement can be satisfied through an intercom system if coordination between the ICF and subscribers is necessary.

1842 EEG/EETS
Scott AFB, IL 62225

AFCS-C-2952
2 June 1978

Purchase Description

1. Nomenclature: Circuit Concentration Bay (CCB) Module and Accessories.

2. Description:

2.1. CCB Module: The CCB module contains 312 miniature connectors mounted on an anodized aluminum panel or a steel panel painted black. Configuration and marking of the CCB module are shown in Figure 1. The CCB module provides flexibility and permits rapid cross connection between sets of three (3) wires.

2.2. Accessories:

2.2.1. Program Cords (see Figure 2): Program cords are provided in lengths of 6, 12 and 18 inches. Each program cord contains a three (3) contact male plug at each end. Each male plug is keyed to permit visual orientation.

2.2.2. Extractor Tool: An extractor tool is used to remove program cords from the CCB module.

3. Purpose: The CCB module, program cords and extractor tool are used in a test facility to rapidly reconfigure circuits while using a minimum amount of space.

4. Requirement

4.1. CCB Module: The CCB module shall contain 312 miniature connectors tightly secured on an anodized aluminum panel or a steel panel painted black. The connectors shall be located as shown in Figure 1. Each of the four groups of connectors (A,B,C,&D) shall be configured into three (3) horizontal rows and 26 vertical columns for a total of 78 connectors per group. Groups shall be separated vertically and horizontally by a minimum of one-half inch (½"). The panel shall be 19"W x 3 15/32"H x 1/8"D and shall be slotted as shown in Figure 1. The overall CCB module depth shall not exceed 2".

4.1.1. Connector: Each connector shall consist of a nylon or plastic body to electrically insulate the contact from the panel. One end of the connector shall consist of a female receptacle which mates electrically and mechanically with the male contacts of the program cords. The opposite end of the

Attachment 1

connector shall consist of a wire wrap pin which is long enough to accept two #24AWG wires, wire wrapped at least eight (8) turns each. The female receptacle end of the connector shall be mounted on the front of the panel.

4.1.2. Labeling: The groups shall be labeled A thru D as shown in Figure 1. The top horizontal row of each group of connectors shall be labeled "T". The middle horizontal row of each group of connectors shall be labeled "R". The bottom horizontal row of each group of connectors shall be labeled "S". The vertical columns of connectors in each group shall be labeled 1 thru 26. Labeling shall be clearly marked with a contrasting color to the panel.

4.2. Accessories - (Provided by contractor in quantities shown in Purchase Request.)

4.2.1. Program Cords: There shall be three different lengths of program cords. Each program cord shall consist of a plug at each end having three (3) male contacts. The plugs shall be interconnected by three (3) each 24AWG stranded wires as shown in Figure 2. The three (3) male contacts of each plug shall be encased in a plastic or nylon material providing electrical insulation. Length of cords shall be as shown in Figure 2.

4.2.1.1. Plug Size: The electrical contacts of each plug shall be located so that the plug can mate electrically and mechanically with each vertical column on the CCB. Furthermore, it shall be possible to have plugs in all vertical columns of the CCB simultaneously.

4.2.1.2. Keying: Each plug shall be keyed to permit visual orientation of the plug such that an operator can correctly patch three connectors of one column with three connectors of any other column. When plugs are properly inserted using visual plug orientation, the connectors labeled "T", "R", and "S", in one column shall be electrically connected to the connectors labeled "T", "R" and "S", respectively, in another column.

4.2.1.3. Plug Extraction: Each plug shall be constructed such that an operator can remove a fully inserted plug by means of an extractor tool without disturbing adjacent plugs.

4.3. Extractor Tool. The extractor tool shall mate physically with plugs used in the program cords. Furthermore, the extractor tool shall contain no moving parts.

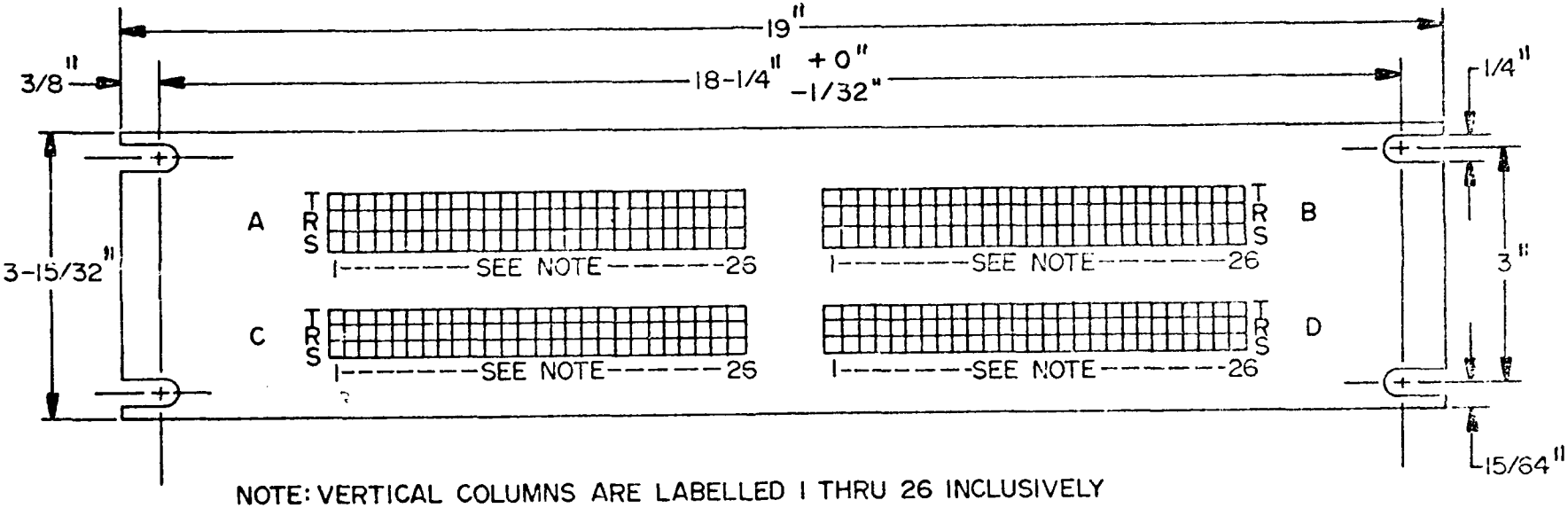


FIGURE 1 CCB PANEL LAYOUT

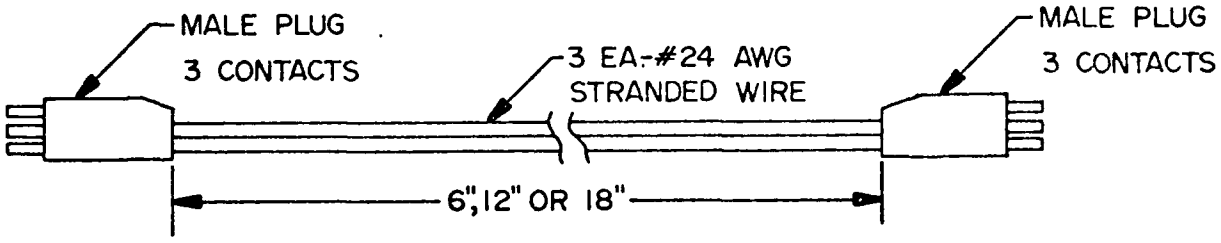


FIGURE 2 PROGRAM CORD

Sources for AFCS-C-2952, dated 2 June 1978

Bunker Ramo Corporation
900 Commerce Drive
Oak Brook, IL 60521

TRW, Inc
1501 Morse Drive
Elkgrove Village, IL 60007

DISTRIBUTION LIST

HQ TAC/ADYCE	5
HQ AFCC/EPE	1
HQ SOUTHERN COMM AREA/EIEGD	2
HQ TAC COMM AREA/DCXP	2
1913 COMM GROUP/DCX	2
1842 EEG/EEISD	10
1842 EEG/EETSC	2


DAT
FILM